

AMENDMENTS TO THE CLAIMS:

Claims 23-56, 60 and 61 are presently pending in this application. Claims 1-22 and 57-59, which are directed to non-elected subject matter, are cancelled herein without prejudice or disclaimer. Claim 61 is added herein.

This listing of claims will replace all prior versions, and listings of claims, in the application.

LISTING OF CLAIMS:

Claims 1 – 22 (Cancelled).

23. (Original) A system for delivery of liquid samples from one or more pin tools to target locations on a substrate, the system comprising:

a plurality of processing stations, each of which performs a procedure on the pin tool, wherein the pin tool includes a lower tip having a slot into which a liquid sample may be drawn;

a transport system that transports the slotted pin tool from processing station to processing station; and

a control system that loads the slotted pin tool by moving it to a loading station at which the slotted pin tool is loaded with the liquid sample, then moves the slotted pin tool to an elevated position above the substrate such that the pin tool is above a target location that is to receive the liquid sample, and then dispenses the liquid sample by lowering the slotted pin tool toward the substrate at a predetermined speed and then halts the movement of the pin tool toward the substrate, thereby expelling the liquid sample from the slotted pin tool onto the target location of the substrate.

24. (Original) A system of claim 23, wherein the control system halts the movement of the slotted pin tool toward the substrate substantially when the open tip of the slotted pin tool contacts the substrate.

25 (Original) A system of claim 24, wherein the open tip of the slotted pin tool is adapted to fit around a material at the target location on the substrate without making contact with any portion of the material.

26. (Original) A system of claim 23, wherein the slotted pin tool has a substantially cylindrical tip having a lateral slot forming a cavity that fits around a material at the target location on the substrate.

27. (Original) A system of claim 23, wherein the slotted pin tool has a substantially cylindrical tip having a lateral slot forming a cavity with a width of greater than approximately 100 μm .

28. (Original) A system of claim 27, wherein the cavity of the cylindrical tip has a width of approximately 300 μm .

29. (Original) A system of claim 27, wherein the cavity of the cylindrical tip has a height greater than approximately 100 μm .

30. (Original) A system of claim 23, wherein the control system loads the slotted pin tool by dipping the tip of the pin tool into a sample-containing reservoir at the loading station; and the control system halts the dipping substantially when the pin tool has been dipped to a depth equal to the pin tool slot.

31. (Original) A system of claim 23, wherein the control system moves the slotted pin tool to the elevated position using pattern recognition techniques to determine correct positioning above the substrate.

32. (Original) A system of claim 23, wherein the control system moves the slotted pin tool to the elevated position by identifying an orientation mark on the substrate that indicates an appropriate location of the substrate.

33. (Original) A system of claim 23, wherein the control system lowers the slotted pin tool by moving the slotted pin tool at a predetermined speed of lowering.

34. (Original) A system of claim 33, wherein the control system changes the volume of liquid sample delivered onto the substrate by changing the speed of lowering.

35. (Original) A system of claim 33, wherein the control system changes the speed of lowering in accordance with known composition of the liquid sample.

36. (Original) A system of claim 23, wherein the control system further moves the slotted pin tool by cleaning the slotted pin tool in a liquid bath after a first liquid sample has been delivered and drying the slotted pin tool prior to dipping the pin tool in the liquid sample.

37. (Original) A system of claim 36, wherein the control system performs cleaning and drying after the first liquid sample has been delivered and before it delivers a second liquid sample.

38. (Original) A system of claim 36, wherein drying comprises moving an air flow air over the slotted pin tool.

39. (Original) A system of claim 36, wherein the liquid bath comprises an ultrasonic bath.

40. (Original) A pin tool for use in a sample delivery system, the pin tool comprising one or more slotted pins each having an open tip adapted to fit around a material at a target location on a substrate without making contact with any portion of the material, wherein:

the slotted pin tool is adapted to be dipped into a sample reservoir containing a liquid sample to be delivered onto the substrate, thereby drawing a volume of liquid sample up into the slotted pins in the pin tool.

41. (Original) A pin tool of claim 40, wherein a pin in the pin tool has a substantially cylindrical tip having a lateral slot forming a cavity with a width of greater than approximately 75 μm .

42. (Original) A pin tool of claim 41, wherein the cavity of the cylindrical tip has a width up to approximately 500 μm .

43. (Original) A pin tool of any of claims 40, wherein the cavity of the cylindrical tip has a height greater than approximately 100 μm .

44. (Original) A combination of a pin tool of claim 41 and a substrate comprising target loci for deposition of sample material, wherein the array of pins in the pin tool is matched to the array of loci on the substrate.

45. (Original) A substrate for use in mass spectrometric analyses, comprising target locations defined by application of photoresist materials and photolithographic deposition; wherein the resulting array of target locations on the substrate are less hydrophobic than the surrounding areas.

46. (Original) A substrate of claim 45, wherein a substrate starting surface is comprised of a material that has an available -OH or primary amine.

47. (Original) The substrate of claim 45, wherein:
the substrate comprises two materials such that the one material has a contact angle that differs by at least about 20 degrees from the second material.

48. (Original) The substrate of claim 47, wherein the first material is polytetrafluoroethylene or a derivative thereof or is dimethyldichlorosilane (DMDCS); and the second material is silicon or silicon dioxide, which form the target loci.

49. (Original) A combination of a pin tool and the substrate of claim 48, wherein the pin tool comprises at least one pin that is slotted.

50. (Currently amended) A combination comprising:
a substrate, comprising an array of target locations on a ~~surfaces~~ surface,
wherein the target locations are less hydrophobic than the surrounding areas; and
a pin tool comprising at least one pin having a substantially cylindrical tip
with a lateral slot forming a cavity that fits around a material deposited at a target location on
the substrate.

51. (Currently amended) A combination of claim 50, wherein the pin has
a substantially cylindrical tip having a lateral slot forming a cavity with a width of greater
than approximately 75 μm , ~~preferably greater than 100 μm .~~

52. (Original) A combination of claim 50, wherein the cavity of the
cylindrical tip has a width between about 100 μm up to approximately 300 μm .

53. (Original) A combination of claim 50, wherein the cavity of the
cylindrical tip in a pin has a height greater than approximately 100 μm .

54. (Original) A combination of claim 50, wherein:
the slotted pin tool is adapted to be dipped into a sample reservoir containing
a liquid sample to be delivered onto the substrate, thereby drawing a volume of liquid sample
up into the slotted pins in the pin tool, and then is moved to an elevated position above the
substrate such that the pin tool is above the target location(s), and then is lowered toward the
substrate such that upon halting the movement thereof the liquid sample is expelled from the
slotted pin tool onto the target location of the substrate.

55. (Original) A method of mass spectrometric analysis, comprising:
depositing matrix material and sample on the target loci of a substrate of claim 45;
introducing the substrate into a mass spectrometer for analysis of the samples; and
analyzing the samples by mass spectrometry.

56. (Original) The method of claim 55, wherein the sample comprises
nucleic acids or proteins.

Claims 57 – 59 (Cancelled).

60. (Original) The pin tool of claim 40, wherein a pin in the tool is
tapered.

61. (New) A combination of claim 50, wherein the pin has a substantially
cylindrical tip having a lateral slot forming a cavity with a width of greater than 100 μm .